

What is claimed is:

1. A method for augmented reality guided  
5 instrument positioning, comprising the steps of:

determining a graphics guide for positioning an  
instrument; and

rendering the graphics guide such that an  
appearance of at least one portion of the graphics  
10 guide is modulated with respect to at least one of  
space and time.

2. The method according to claim 1, wherein said  
rendering step comprises the step of varying a  
15 transparency of the at least one portion of the  
graphics guide with respect to other portions of the  
graphics guide to provide a substantially unobstructed  
view through the at least one portion of the graphics  
guide to at least a portion of the instrument.

20

3. The method according to claim 1, wherein said  
rendering step comprises the step of varying a  
transparency of the at least one portion of the  
graphics guide during pre-defined time intervals to  
25 provide a substantially unobstructed view through the  
at least one portion of the graphics guide to at least

a portion of the instrument during the pre-defined time intervals.

4. The method according to claim 1, wherein said  
5 rendering step comprises the step of sequentially  
varying a transparency of each of a plurality of  
portions of the graphics guide during at least one pre-  
defined time interval to provide a substantially  
unobstructed view through each of the plurality of  
10 portions to at least a portion of the instrument as the  
transparency of each of the plurality of portions is  
varied during the at least one pre-defined time  
interval.

15 5. The method according to claim 4, wherein the  
plurality of portions are consecutive.

6. The method according to claim 1, wherein said  
rendering step comprises the step of varying a  
20 transparency of the at least one portion of the  
graphics guide such that the at least one portion  
repeatedly switches between transparent and less  
transparent.

25 7. The method according to claim 1, wherein said  
determining step comprises the step of constructing the

graphics guide as a line, and said rendering step comprises the step of modulating a transparency of the line with respect to time so that the line repeatedly fades in and out of view to provide a substantially unobstructed view of the instrument when the line is out of view.

8. The method according to claim 1, wherein said determining step comprises the step of constructing the graphics guide as a line, and said rendering step comprises the step of modulating a transparency of portions of the line so that at least a portion of the instrument is substantially unobstructed when viewed through the portions of the line.

9. The method according to claim 1, wherein said determining step comprises the step of constructing the graphics guide as a line, and said rendering step comprises the step of modulating a transparency of portions of the line with respect to time and space so that at least a portion of the instrument is substantially unobstructed when viewed through the portions of the line during pre-defined time intervals.

10. The method according to claim 1, wherein said determining step comprises the step of constructing the

graphics guide as a cylinder, and said rendering step comprises the step of modulating a transparency of the cylinder with respect to time so that the cylinder repeatedly fades in and out of view to provide a substantially unobstructed view of the instrument when the cylinder is out of view.

11. The method according to claim 1, wherein said determining step comprises the step of constructing the graphics guide as a cylinder, and said rendering step comprises the step of modulating a transparency of portions of the cylinder so that at least a portion of the instrument is substantially unobstructed when viewed through the portions of the cylinder.

12. The method according to claim 1, wherein said determining step comprises the step of constructing the graphics guide as a cylinder, and said rendering step comprises the step of modulating a transparency of portions of the cylinder with respect to time and space so that at least a portion of the instrument is substantially unobstructed when viewed through the portions of the cylinder during pre-defined time intervals.

13. An apparatus for augmented reality guided instrument positioning, comprising:

a graphics guide generator for generating a graphic guide for positioning an instrument; and

a rendering device for rendering the graphics guide such that an appearance of at least one portion of the graphics guide is modulated with respect to at least one of space and time.

14. The apparatus according to claim 13, wherein said rendering device varies a transparency of the at least one portion of the graphics guide with respect to other portions of the graphics guide to provide a substantially unobstructed view through the at least one portion of the graphics guide to at least a portion of the instrument.

15. The apparatus according to claim 13, wherein said rendering device varies a transparency of the at least one portion of the graphics guide during pre-defined time intervals to provide a substantially unobstructed view through the at least one portion of the graphics guide to at least a portion of the instrument during the pre-defined time intervals.

16. The apparatus according to claim 13, wherein said rendering device sequentially varies a transparency of each of a plurality of portions of the graphics guide during at least one pre-defined time interval to provide a substantially unobstructed view through each of the plurality of portions to at least a portion of the instrument as the transparency of each of the plurality of portions is varied during the at least one pre-defined time interval.

17. The apparatus according to claim 16, wherein the plurality of portions are consecutive.

18. The apparatus according to claim 13, wherein said rendering device varies a transparency of the at least one portion of the graphics guide such that the at least one portion repeatedly switches between transparent and less transparent.

19. The apparatus according to claim 13, wherein said graphics guide generator constructs the graphics guide as a line, and said rendering device modulates a transparency of the line with respect to time so that the line repeatedly fades in and out of view to provide a substantially unobstructed view of the instrument when the line is out of view.

20. The apparatus according to claim 13, wherein  
said determining device constructs the graphics guide  
as a line, and said rendering device modulates a  
5 transparency of portions of the line so that at least a  
portion of the instrument is substantially unobstructed  
when viewed through the portions of the line.

21. The apparatus according to claim 13, wherein  
10 said graphics guide generator constructs the graphics  
guide as a line, and said rendering device modulates a  
transparency of portions of the line with respect to  
time and space so that at least a portion of the  
instrument is substantially unobstructed when viewed  
15 through the portions of the line during pre-defined  
time intervals.

22. The apparatus according to claim 13, wherein  
said graphics guide generator constructs the graphics  
20 guide as a cylinder, and said rendering device  
modulates a transparency of the cylinder with respect  
to time so that the cylinder repeatedly fades in and  
out of view to provide a substantially unobstructed  
view of the instrument when the cylinder is out of  
25 view.

23. The apparatus according to claim 13, wherein  
said graphics guide generator constructs the graphics  
guide as a cylinder, and said rendering device  
modulates a transparency of portions of the cylinder so  
5 that at least a portion of the instrument is  
substantially unobstructed when viewed through the  
portions of the cylinder.

24. The apparatus, according to claim 13, wherein  
10 said graphics guide generator constructs the graphics  
guide as a cylinder, and said rendering device  
modulates a transparency of portions of the cylinder  
with respect to time and space so that at least a  
portion of the instrument is substantially unobstructed  
15 when viewed through the portions of the cylinder during  
pre-defined time intervals.